

P 802487/WO/1

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5 Method and device for issuing danger warnings, in
 particular in a motor vehicle

10 The invention relates to a method for issuing danger warnings, in particular in a motor vehicle, according to the preamble of patent claim 1, and an associated device.

15 DE 199 52 392 A1 discloses a method for making available route-dependent warning information for the driver of a motor vehicle. By means of digital roadmaps it is detected, for example, whether the driver is approaching a bend lying ahead. If the current velocity of the vehicle is higher than a bend limiting velocity, the driver is firstly warned visually. If the driver does not react to the visual warning within a certain time, i.e. if he continues to drive with unreduced velocity, an additional audible warning is then issued.

25 The older German patent application 102 41 133.6 which was not published at the time of the priority date of the present document discloses a display and indication method for issuing danger warnings for a radio warning system in which an urgency level of the danger warning to be issued is determined and the type of danger warning display is selected as a function of the degree of determined chronological urgency. Distance indications are intentionally dispensed with here.

35 The invention is based on the object of specifying a novel display and indication method for issuing danger warnings with an improved information output and an associated display/indication device.

 This object is achieved by means of a display and indication method for issuing danger warnings having

the features of claims 1 or 2, and by means of a display/indication device having the features of claim 7. The dependent claims relate to advantageous embodiments and developments of the invention.

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The invention is based on the idea that in a display and indication method for issuing danger warnings information about a degree of urgency is output only by a voice output and/or by a single voice output. In the
10 display and indication method, one of a plurality of predefined display/indication modes - which comprises at least one voice output and a further display type - is selected as a function of the urgency level.

15 The implementation of different voice outputs for distinguishing between different urgency levels combined with an additional display type, for example a visual display and/or a haptic display, has the advantage that the corresponding voice output already
20 contains the important information without the driver having to interrogate a further information source for this purpose, for example without him having to read a display unit for presenting a visual display.

25 The additional visual display serves only as a visual information store which the driver can access when necessary in order to freshen up information. This minimizes a distraction effect and increases the comprehensibility of the warnings and the level of
30 acceptance of the system.

According to one advantageous development of the invention, when a first urgency level with a low degree of urgency is determined the voice output can include a
35 distance indication which indicates the approximate distance from the source of danger. The distance indication signals to the driver that he still has

sufficient time to reduce his velocity by closing the throttle and possibly braking slightly.

5 When a second urgency level with a high degree of urgency is determined, the driver can be issued with a warning which signals to him that a rapid reaction is necessary and the driver must implement a braking deceleration which possibly also lies outside the normal driving comfort range.

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At both urgency levels, the voice output is carried out for the purpose of keeping the distraction effect as low as possible. The different degrees of urgency are communicated by the various contents or formulations of
15 the voice output.

In an alternative embodiment of the invention, at least one of the display/indication modes may comprise a single voice output which warns about the danger and
20 includes information about the determined urgency level. The distraction of the driver is reduced further by the merely single voice output.

In addition to the information about the degree of
25 urgency of the danger warning, it is possible, for example by means of a visual display and/or by means of the voice output, to issue information about a type of danger for both urgency levels.

30 In order to determine the urgency level external data, for example, is received and evaluated from other vehicles or from a control centre. Alternatively or additionally it is also possible to evaluate data from vehicle sensors which can also comprise a locating
35 system with a digital map and/or a navigation system.

The display/indication device according to the invention comprises a control/evaluation unit, a voice

output unit with specific functionality and a further display unit for implementing the display and indication method.

5 In addition, a data receiver unit and/or a vehicle-mounted sensor unit which make available, for example to the control/evaluation unit, data for determining the urgency level and/or the distance from the danger point, may be provided. External data, for
10 example from other vehicles or from a control centre, can also be evaluated by the data receiver unit.

One advantageous embodiment of the invention is illustrated in the drawings and will be described
15 below. In said drawings:

fig. 1 shows a flowchart of a display and indication method for warning about dangers in a motor vehicle; and

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fig. 2 shows a schematic block diagram of a display/indication device for warning about dangers in a motor vehicle.

25 In the display/indication and indication method for issuing danger warnings which is illustrated in fig. 1, an urgency level of the danger warning to be issued is determined in a first step 100. In a subsequent step 200, one of a plurality of display/indication modes is
30 selected as a function of the determined degree of urgency. When a first urgency level with a low degree of urgency is determined, a first display/indication mode (step 300) is selected and a single voice output and a further display/indication type, which warn about
35 the danger, are then activated in step 350, with only the voice output including information about the degree of urgency. The further display type is, for example, a visual display and/or haptic display. In the

illustrated exemplary embodiment, an additional visual display/indication is activated and the low degree of urgency is represented by the single voice output of the distance from the danger point.

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When a second urgency level is determined with a high degree of urgency, that is to say one which is higher than the above low degree of urgency, a second display/indication mode (step 400) is selected and a single voice output and a further display type, in the form of a visual display, which warn about the danger, are then activated in step 450, with only the voice output including information about the degree of urgency. In the illustrated exemplary embodiment, the high degree of urgency is represented by the single voice output of a warning.

At the first urgency level and when the associated first display/indication mode has been selected, the driver is informed by voice once about the type of danger and the distance from the danger point, for example "traffic jam in 700 meters" or "accident in 600 meters". The visual display comprises a warning symbol with an additional text which also describes the danger, for example "traffic jam" or "accident". The first urgency level thus has a more informative character. It is important that the distance indication is given only once by means of the voice output and is not display visually.

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This approach is based on the knowledge that, on the one hand, car drivers are accustomed, from their everyday experience, to dealing with specific distance indications, for example due to distance indications on road signs, but on the other hand are bad at judging distances. Because the voice output includes the accustomed and therefore also expected distance indication, the level of acceptance of the display and

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indication method increases. The driver has the impression of having received all the relevant information. At the same time, the single acoustic distance indication ensures that the driver is only
5 provided with a qualitative impression of the distance from the danger point. This property is important because the precise distance from the danger point cannot generally be determined and the driver can therefore not rely on the distance indication. For this
10 reason acoustic updating of the distance indication or continuous display/indication of said display/indication is avoided here.

At the second urgency level and when the associated
15 second display/indication mode is selected, the driver is requested directly by the voice output of a warning to be careful and to carry on driving with greater attention. In addition, he is informed about the type of danger. Examples of the warning in the voice output
20 of the second urgency level are "danger, traffic jam" or "danger, accident". The use of the term "danger" signals to the driver that he must react immediately to the warning, for example by rapid and strong braking, if appropriate also beyond a usual driving comfort
25 range since the danger point is located directly in front of him. There is no longer any voice output with a distance indication. The spatial and above all chronological proximity of the event is described by the warning "danger". With the second urgency level
30 there is also a visual display/indication which in the illustrated exemplary embodiment is identical to that from the first urgency level. It thus becomes clear that the voice output is the primary information channel via which the degree of urgency of a danger
35 warning is communicated. The visual display is only to be seen as supplementary.

In order to determine the urgency level, in the illustrated exemplary embodiment data are evaluated from a data receiver unit and/or from a sensor unit with a locating unit with a digital map and a navigation system.

As is apparent from fig. 2, the display/indication device shown there for issuing danger warnings in a motor vehicle 1 comprises a control/evaluation unit 2 for determining a chronological urgency level of the danger warning to be issued and for selecting one of a plurality of predefined display/indication modes as a function of the degree of urgency determined and a display/indication device 3 for issuing the danger warning with the selected display/indication mode. The display/indication device 3 comprises a visual display/indication unit 3.1 and a voice output unit 3.2 which warn about the danger in at least one display/indication mode, with only the voice output unit 3.2 outputting information about the degree of urgency.

If the control/evaluation unit 2 determines a first chronological urgency level with a low degree of urgency, the visual display unit 3.1 and the voice output unit 3.2 output a display/indication about the type of danger, for example "traffic jam" or "accident". The voice output unit 3.2 additionally outputs a distance indication which corresponds to the approximate distance of the vehicle from the danger point.

If the control/evaluation unit 2 determines a second chronological urgency level with a high degree of urgency, the visual display/indication unit 3.1 and the voice output unit 3.2 again output the display/indication about the type of danger. The voice

output unit 3.2 additionally outputs a warning which signals that an immediate reaction is necessary.

In order to determine the urgency, the
5 control/evaluation unit 2 evaluates external data which
is received by a data receiver unit 4 from other
vehicles and/or from a control centre. Alternatively or
additionally it is possible to evaluate data from a
vehicle-mounted sensor unit 5 which, for example,
10 comprises sensors of driver assistance systems and/or
of a locating unit with a digital map and/or a
navigation system.